UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/747,786	12/22/2000	Giovanni Di Bernardo	98CT25653253	7621

7590 03/26/2004

Christopher F. Regan
Allen, Dyer, Doppelt, Milbrath & Gilchrist, P.A.
P.O. Box 3791
Orlando, FL 32802-3791

EXAMINER	
PATHAK, SUDHANSHU C	

ART UNIT	PAPER NUMBER
2634	8

DATE MAILED: 03/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/747,786	BERNARDO ET AL.	
	Examiner	Art Unit	
	Sudhanshu C. Pathak	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *December 22nd, 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 9-32 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 9-32 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *December 22nd, 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 1.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 9-to-32 are pending are pending in the application.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

3. Claims 9, 25 (apparatus, method), 12, 28 (apparatus, method) are rejected under 35 U.S.C. 102(a) as being anticipated by Abarbanel at al. (5,923,760).

Regarding to Claims 9, 25, Abarbanel discloses a chaotic communication system for use in a wired or wireless transmission links (Abstract, lines 1-17 & Column 1, lines 12-45 & Column 2, lines 41-67 & Column 3, lines 1-67) comprising a transmission channel (Fig. 1, element 26 & Fig. 4, element 51 & Fig. 5, element 80); a signal source for providing a discrete signal (Fig. 4, element 40 & Fig. 5, element 66); a chaotic modulator for modulating the discrete signal for transmitting over said transmission channel (Fig. 4, element 44 & Fig. 5, element 68); and an incoherent discriminator for receiving the modulated discrete signal from said transmission channel (Fig. 4, element 56 & Fig. 5, element 84).

Regarding to Claims 12, 28, Abarbanel discloses a chaotic communication system for use in a wired or wireless transmission links as described above. Abarbanel further discloses the receiver (discriminator) to be self-synchronizing (Column 1, lines 35-46 & Column 3, lines 37-51 & Column 4, lines 42-45).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 10, 26 (apparatus, method), 11, 27 (apparatus, method), 17, 18 & 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abarbanel at al. (5,923,760) in view of J. Lee et al. (Secure Communication Using Chaos, IEEE Global Telecommunications Conference, Globecom '95, November 1995, Pages 1183-1187) in further view of Cutler et al. (5,847,960).

Regarding to Claims 10, 26, Abarbanel discloses a chaotic communication system for use in a wired or wireless transmission links as described above. Abarbanel further discloses implementing a filter at the receiver (Figure 1, element 28), which serve to suppress components of the noise at specified frequencies (Column 1, lines 65-67). Abarbanel also discloses that the frequency bandwidth of available transmission links lack a low frequency response with an inability to transmit dc-signals, and have a high frequency cutoff defining the upper end of the band (Column 2, lines 15-26). Abarbanel discloses a bandpass characteristic of the transmission channel and implementing a bandpass filter at the receiver (discriminator) so as to synchronize the receiver with the transmitted signal and allowing the demodulation of the received signal (Column 2, lines 40-55 & Column 4, lines 25-35 & Claim 6). However, Abarbanel does not disclose a rectifier connected

to the high-pass filter and further a low-pass filter connected to the output of the rectifier.

Lee discloses a secure communications scheme using a chaotic communications system. Lee also discloses determining the data stream by comparing the power level of the dynamical error of each data stream (Page 1183, Abstract, lines 2-17 & Page 1187, Fig. 2-3). Lee further discloses maximally correlating the received signal to determine the cost function for determining the received signal (Page 1184, right-hand column, lines 1-55, Equation 4 & Page 1185, Equations 6-7 & 11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that it is possible to implement the demodulation of maximally correlating the received signal as described in Lee in the system as described in Abarbanel perform the same function as a rectifier but digitally since the process of maximally correlation is equivalent to rectification. Furthermore, there is no criticality in implementing a high pass filter at the front end of the receiver and as described in Abarbanel a bandpass filter performs the same function furthermore, a bandpass filter can be implemented using a high pass filter. However, Abarbanel in view of Lee does not disclose a low pass filter connected to the output of the rectifier.

Cutler discloses a fourth-order low pass filter to provide good smoothing while keeping the implementation simple (Column 9, lines 19-38, 65-67 & Column 10, lines 1-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that implementing the low pass filter as described in Cutler

after the rectifier (correlator) as described in Abarbanel in view of Lee provides a smoothed and stable signal while keeping the overall filter implementation simple.

Regarding to Claims 11, 27, Abarbanel in view of Lee in further view of Cutler discloses a chaotic communication system for use in a wired or wireless transmission links comprising high pass and low pass filters and a correlator (rectifier) as described above. Lee further discloses comparing the power level of the dynamical errors of the data stream with a chosen threshold (Page 1184, right-hand column, lines 35-55, Equation 4 & Page 1187, Fig. 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Abarbanel in view of Lee in further view of Cutler satisfies the limitation of the claim.

Regarding to Claim 17, Abarbanel discloses a chaotic communication system for use in a wired or wireless transmission links (Abstract, lines 1-17 & Column 1, lines 12-45 & Column 2, lines 41-67 & Column 3, lines 1-67) comprising a transmission channel (Fig. 1, element 26 & Fig. 4, element 51 & Fig. 5, element 80); a signal source for providing a discrete signal (Fig. 4, element 40 & Fig. 5, element 66); a chaotic modulator for modulating the discrete signal for transmitting over said transmission channel (Fig. 4, element 44 & Fig. 5, element 68); and an incoherent discriminator for receiving the modulated discrete signal from said transmission channel (Fig. 4, element 56 & Fig. 5, element 84). Abarbanel further discloses implementing a filter at the receiver (Figure 1, element 28), which serve to suppress components of the noise at specified frequencies (Column 1, lines 65-67). Abarbanel also discloses that the frequency bandwidth of available transmission

links lack a low frequency response with an inability to transmit dc-signals, and have a high frequency cutoff defining the upper end of the band (Column 2, lines 15-26). Abarbanel discloses a bandpass characteristic of the transmission channel and implementing a bandpass filter at the receiver (discriminator) so as to synchronize the receiver with the transmitted signal and allowing the demodulation of the received signal (Column 2, lines 40-55 & Column 4, lines 25-35 & Claim 6). However, Abarbanel does not disclose a rectifier connected to the high-pass filter and further a low-pass filter connected to the output of the rectifier.

Lee discloses a secure communications scheme using a chaotic communications system. Lee also discloses determining the data stream by comparing the power level of the dynamical error of each data stream (Page 1183, Abstract, lines 2-17 & Page 1187, Fig. 2-3). Lee further discloses maximally correlating the received signal to determine the cost function for determining the received signal (Page 1184, right-hand column, lines 1-55, Equation 4 & Page 1185, Equations 6-7 & 11). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that it is possible to implement the demodulation of maximally correlating the received signal as described in Lee in the system as described in Abarbanel perform the same function as a rectifier but digitally since the process of maximally correlation is equivalent to rectification. Furthermore, there is no criticality in implementing a high pass filter at the front end of the receiver and as described in Abarbanel a bandpass filter performs the same function, furthermore a bandpass

filter can be implemented using a high pass filter. However, Abarbanel in view of Lee does not disclose a low pass filter connected to the output of the rectifier.

Cutler discloses a fourth-order low pass filter to provide good smoothing while keeping the implementation simple (Column 9, lines 19-38, 65-67 & Column 10, lines 1-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that implementing the low pass filter as described in Cutler after the rectifier (correlator) as described in Abarbanel in view of Lee provides a smoothed and stable signal while keeping the overall filter implementation simple.

Regarding to Claims 18, Abarbanel in view of Lee in further view of Cutler discloses a chaotic communication system for use in a wired or wireless transmission links comprising high pass and low pass filters and a correlator (rectifier) as described above. Lee further discloses comparing the power level of the dynamical errors of the data stream with a chosen threshold (Page 1184, right-hand column, lines 35-55, Equation 4 & Page 1187, Fig. 3). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Abarbanel in view of Lee in further view of Cutler satisfies the limitation of the claim.

Regarding to Claims 19, Abarbanel in view of Lee in further view of Cutler discloses a chaotic communication system for use in a wired or wireless transmission links comprising high pass and low pass filters, and a correlator (rectifier) as described above. Abarbanel further discloses a chaotic communication system for use in a wired or wireless transmission links as described above. Abarbanel further discloses the receiver (discriminator) to be self-synchronizing

(Column 1, lines 35-46 & Column 3, lines 37-51 & Column 4, lines 42-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that Abarbanel in view of Lee in further view of Cutler satisfies the limitations of the claim.

6. Claims 13, 29 (apparatus, method), are rejected under 35 U.S.C. 103(a) as being unpatentable over Abarbanel at al. (5,923,760) in view of Applicant Admitted Prior Art (AAPA).

Regarding to Claims 13, 29, Abarbanel discloses a chaotic communication system for use in a wired or wireless transmission links as described above. However, Abarbanel does not specify the signal source to generate a low logic value signal having associated a chaotic evolution corresponding to a complete Chua's attractor and further the low logic value corresponding to a left-hand lobe of the Chua's attractor.

The Applicant Admitted Prior Art (AAPA) discloses a chaotic communication system (Specification, Page 4, lines 30-35 & Page 5, lines 1-11) comprising a modulation method called chaos shift keying wherein one of two chaotic signals generated by two different systems or the same system are associated with a low logic value and a high logic value is transmitted (Specification, Page 5, lines 28-34). The AAPA further discloses a low logic value corresponding to a left-hand lobe of the Chua's attractor (Specification, Page 10, lines 15-30 & Figure 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the modulation scheme as described in the AAPA can be implemented in the

chaotic system as described in Abarbanel to provide distinct chaotic signals for the high and low logic values, thus satisfying the limitations of the claim.

7. Claims 14, 30 (apparatus, method), 16, 32 (apparatus, method), 21 & 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abarbanel at al. (5,923,760) in view of Cutler et al. (5,847,960) in further view of Giacomini (6,016,078) in further view of Brenman et al. (4,590,942).

Regarding to Claims 14, 30 & 16, 32, Abarbanel discloses a chaotic communication system for use in a wired or wireless transmission links as described above. However, Abarbanel does not disclose the discriminator (receiver) to comprise a low pass filter.

Cutler discloses a fourth-order low pass filter to provide good smoothing while keeping the implementation simple (Column 9, lines 19-38, 65-67 & Column 10, lines 1-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that implementing the low pass filter as described in Cutler after the rectifier (correlator) as described in Abarbanel provides a smoothed and stable signal while keeping the overall filter implementation simple. However, Abarbanel in view of Cutler does not disclose a null-threshold comparator connected to the output of the low pass filter for providing a square wave output.

Giacomini discloses a low offset output null-threshold comparator to output a square-wave signal for high precision output despite varying operating conditions such as temperature, supply voltage, bias current etc. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the

null-threshold comparator as described in Giacomini can be implemented in the receiver circuit as described in Abarbanel in view of Cutler so as to compare the multiple voltages to a threshold value so as to determine the validity of the received signal. However, Abarbanel in view of Cutler in further view of Giacomini does not disclose a divider connected to the output of the comparator for scaling the square wave output signal.

Brenman discloses a divider circuit (Fig. 5, element 84 & Fig. 5a, element 86-88) to provide amplitude control for the output signal (Column 5, lines 40-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the divider as described in Brenman can be implemented at the output of the comparator as described in Abarbanel in view of Cutler in further view of Giacomini so as to control the output amplitude of the comparator to a desired value, thus Abarbanel in view of Cutler in further view of Giacomini in further view of Brenman satisfies the limitation of the claim.

Regarding to Claims 21 & 24, Abarbanel discloses a chaotic communication system for use in a wired or wireless transmission links (Abstract, lines 1-17 & Column 1, lines 12-45 & Column 2, lines 41-67 & Column 3, lines 1-67) comprising a transmission channel (Fig. 1, element 26 & Fig. 4, element 51 & Fig. 5, element 80); a signal source for providing a discrete signal (Fig. 4, element 40 & Fig. 5, element 66); a chaotic modulator for modulating the discrete signal for transmitting over said transmission channel (Fig. 4, element 44 & Fig. 5, element 68); and an incoherent discriminator for receiving the modulated discrete signal from said transmission

channel (Fig. 4, element 56 & Fig. 5, element 84). However, Abarbanel does not disclose the discriminator (receiver) to comprise a low pass filter.

Cutler discloses a fourth-order low pass filter to provide good smoothing while keeping the implementation simple (Column 9, lines 19-38, 65-67 & Column 10, lines 1-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that implementing the low pass filter as described in Cutler after the rectifier (correlator) as described in Abarbanel provides a smoothed and stable signal while keeping the overall filter implementation simple. However, Abarbanel in view of Cutler does not disclose a null-threshold comparator connected to the output of the low pass filter for providing a square wave output.

Giacomini discloses a low offset output null-threshold comparator to output a square-wave signal for high precision output despite varying operating conditions such as temperature, supply voltage, bias current etc. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the null-threshold comparator as described in Giacomini can be implemented in the receiver circuit as described in Abarbanel in view of Cutler so as to compare the multiple voltages to a threshold value so as to determine the validity of the received signal. However, Abarbanel in view of Cutler in further view of Giacomini does not disclose a divider connected to the output of the comparator for scaling the square wave output signal.

Brenman discloses a divider circuit (Fig. 5, element 84 & Fig. 5a, element 86-88) to provide amplitude control for the output signal (Column 5, lines 40-50). Therefore,

it would have been obvious to one of ordinary skill in the art at the time of the invention that the divider as described in Brenman can be implemented at the output of the comparator as described in Abarbanel in view of Cutler in further view of Giacomini so as to control the output amplitude of the comparator to a desired value, thus Abarbanel in view of Cutler in further view of Giacomini in further view of Brenman satisfies the limitation of the claim.

8. Claims 15, 31 (apparatus, method), 22 & 23, are rejected under 35 U.S.C. 103(a) as being unpatentable over Abarbanel at al. (5,923,760) in view of Cutler et al. (5,847,960) in further view of Giacomini (6,016,078) in further view of Brenman et al. (4,590,942) in further view of Applicant Admitted Prior Art (AAPA).

Regarding to Claims 15, 31, 22 & 23, Abarbanel in view of Cutler in further view of Giacomini in further view of Brenman discloses a chaotic communication system for use in a wired or wireless transmission links comprising a low pass filter, null-threshold comparator, and a divider as described above. However, these references do not disclose a signal source to generate a low logic value signal that is associated with a chaotic dynamics corresponding to a left-hand lobe of a Chua's attractor.

The Applicant Admitted Prior Art (AAPA) discloses a chaotic communication system (Specification, Page 4, lines 30-35 & Page 5, lines 1-11) comprising a modulation method called chaos shift keying wherein one of two chaotic signals generated by two different systems or the same system are associated with a low logic value and a high logic value is transmitted (Specification, Page 5, lines 28-34).

The AAPA further discloses a low logic value corresponding to a left-hand lobe of the Chua's attractor (Specification, Page 10, lines 15-30 & Figure 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the modulation scheme as described in the AAPA can be implemented in the chaotic system as described in Abarbanel in view of Cutler in further view of Giacomini in further view of Brenman to provide distinct chaotic signals for the high and low logic values, thus satisfying the limitations of the claim.

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abarbanel at al. (5,923,760) in view of J. Lee et al. (Secure Communication Using Chaos, IEEE Global Telecommunications Conference, Globecom '95, November 1995, Pages 1183-1187) in further view of Cutler et al. (5,847,960) in further view of Applicant Admitted Prior Art (AAPA).

Regarding to Claim 20, Abarbanel in view of Lee in further view of Cutler discloses a chaotic communication system for use in a wired or wireless transmission links comprising high pass and low pass filters, and a correlator (rectifier) as described above. However, the above references do not specify the signal source to generate a low logic value signal having associated a chaotic evolution corresponding to a complete Chua's attractor and further the low logic value corresponding to a left-hand lobe of the Chua's attractor.

The Applicant Admitted Prior Art (AAPA) discloses a chaotic communication system (Specification, Page 4, lines 30-35 & Page 5, lines 1-11) comprising a modulation method called chaos shift keying wherein one of two chaotic signals

generated by two different systems or the same system are associated with a low logic value and a high logic value is transmitted (Specification, Page 5, lines 28-34). The AAPA further discloses a low logic value corresponding to a left-hand lobe of the Chua's attractor (Specification, Page 10, lines 15-30 & Figure 8-9). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that the modulation scheme as described in the AAPA can be implemented in the chaotic system as described in Abarbanel in view of Lee in further view of Cutler to provide distinct chaotic signals for the high and low logic values, thus satisfying the limitations of the claim.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhanshu C. Pathak whose telephone number is (703) 305-0341. The examiner can normally be reached (Monday-Friday from 8:30 AM to 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Chin, can be reached at (703) 305-4714.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered responses should be brought to:

Crystal Part II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

STEPHEN CHIN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600